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A LONGITUDINAL EVALUATION OF READING ACHIEVEMENT IN SMALL CLASSES.

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A 3-YEAR EXPERIMENTAL PRIMARY-GRADE READING PROGRAM CONDUCTED WITH A 50 PERCENT REDUCTION OF READING CLASS SIZE WAS EVALUATED IN THE RIVERSIDE, CALIFORNIA, UNIFIED SCHOOL DISTRICT FOR THE YEARS 1962-1965. TEST SCORES WERE ANALYZED FOR 656 CHILDREN IN THE EXPERIMENTAL GROUP WHO HAD 2 OR MORE YEARS OF EXPERIENCE IN THE EXPERIMENTAL PROGRAM AND FOR 602 CHILDREN IN THE CONTROL GROUP WHO HAD 1 YEAR OR LESS IN THE EXPERIMENTAL PROGRAM. THE SMALL-CLASS PROGRAM (AN AVERAGE OF 15 STUDENTS PER CLASS) WAS INITIATED IN A STRATIFIED RANDOM SAMPLE OF SEVEN ELEMENTARY SCHOOLS THE 1ST YEAR, WITH SIX SCHOOLS ADDED THE 2D YEAR AND EIGHT MORE ADDED THE 3D YEAR. DATA GATHERED FROM THE METROPOLITAN READINESS TESTS IN GRADE 1, METROPOLITAN ACHIEVEMENT TEST IN GRADES 2 AND 3, THE CALIFORNIA SHORT FORM TEST OF MENTAL MATURITY IN GRADE 2, AND THE SCHOOL AND COLLEGE APTITUDE TEST IN GRADE 4 WERE ANALYZED ACCORDING TO EXPERIMENTAL AND CONTROL GROUP READINESS, INTELLIGENCE, READING ACHIEVEMENT, AND SEX DIFFERENCES. THE EXPERIMENTAL GROUP ACHIEVED SIGNIFICANTLY HIGHER THAN THE CONTROL GROUP, ACCORDING TO THE AMOUNT OF TIME SPENT ON THE EXPERIMENTAL PROGRAM. FINDINGS INDICATED THAT FIRST GRADE INSTRUCTION WAS MOST CRUCIAL AND THAT BOYS BENEFITED MORE FROM REDUCED CLASS SIZE THAN GIRLS. TABLES ARE INCLUDED. (LS)

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A LONGITUDINAL EVALUATION OF READING ACHIEVEMENT IN SMALL CLASSES

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In the 1962-63 school year an experimental primary-grade reading program was initiated in the Riverside Unified School District, Riverside, California. The program was based on the assumption that reading instruction provided in small classes is more effective than in large classes.

In the Riverside experiment a fifty percent reduction in class size was accomplished by having half of each class come to school at nine in the morning. These children received instruction in reading and language arts until ten o'clock when the rest of the class arrived. The latter group received its reading instruction the last hour of the afternoon after the first group had gone home. Class size for reading instruction was reduced administratively from thirty students in the average class to fifteen in the experimental program. As a result, each child was in school twenty-five fewer minutes per day, and the teacher taught an extra twenty-five minutes per day. Assignment to the nine o'clock or ten o'clock group was often based on bus schedules, but was not based on reading ability.

A stratified random sample of seven elementary schools began the program in 1962-63 with all children in grades one through three participating. In 1963-64 six schools were added, and in 1964-65 eight more.

Answers were sought to the following questions:

1. Is achievement in small classes greater than in regular classes?

RE 000 121

2. Is small class instruction most advantageous at a particular grade level?

3. Is there a cumulative effect of small classes on achievement?

For all analyses, only the scores of children who had started in the district, and remained in the district, were utilized. This condition was imposed in order to eliminate confounding of results due to differential achievement levels of children moving into the district.

The Metropolitan Readiness Tests were administered to all children early in the first grade, Metropolitan Achievement Tests in early second and third grades, and the Sequential Tests of Educational Progress at fourth grade level. The California Short Form Test of Mental Maturity was administered to all children at the second grade level and the School and College Aptitude Tests at fourth grade level. Reading achievement scores for each group were compared each year by the analysis of covariance.

Table 1 shows the average first grade reading readiness score and the average reading achievement score at beginning second grade level for the experimental and control groups.

TABLE 1

Average First Grade Reading Readiness Score and Average Second Grade Reading Achievement for the Experimental and Control Groups

	N	Reading Readiness	Reading Achievement
Experimental	251	55.5	50.9
Control	744	55.4	48.9

The analysis of covariance of second grade scores controlling on reading readiness resulted in an F-ratio of 5.176 which, with one and 993 degrees of freedom, has a probability of less than .05. The experimental group scored significantly higher after one year of instruction than the control group on the reading test.

These scores were further analyzed by sex and by readiness test prediction. Table 2 shows the average achievement of boys and girls in the experimental and control groups by readiness test prediction.

TABLE 2

Mean Reading Achievement by Sex, Group, and Readiness Test Prediction

Readiness Test Predictions	A	B	C	D	$\bar{X}$
Male Experimental	56.1	48.7	46.5	45.6	49.4
Male Control	53.2	46.9	44.6	39.7	46.4
Difference	2.9	1.8	1.9	5.9	3.0
Female Experimental	58.8	49.9	51.9	46.0	52.4
Female Control	56.9	52.4	48.5	43.6	51.5
Difference	1.9	-2.5	3.4	2.4	.9

It will be noted from Table 2 that boys in the experimental group scored higher in reading achievement at each readiness level than did boys in the control group. The difference in achievement between boys in the two groups is statistically significant ($P<.01$). The difference in achievement between the two groups of girls is much smaller and is not significant ($P>.05$). Although there appears to be a facilitating effect of the experimental program for both boys and girls, it is clearly more pronounced for boys, and boys are responsible for the significant increase in achievement scores of the experimental group. Similar differences were found at third and fourth grade levels.

In the third grade similar comparisons were made. When second grade reading scores were controlled, again using analysis of covariance, Group I children gained significantly more than other groups, but there was no significant difference between those who started the experimental program in the second grade and those in the control group.

When fourth grade reading achievement was analyzed, controlling on third grade scores, no significant differences in achievement were found between the groups. However, children in the second year of the experimental program grew more than those who had been in one year or no years.

The important question was whether the experimental program would produce significant achievement differences in the fourth grade when reading readiness or IQ were controlled.

For this analysis two groups were formed. The experimental group was composed of the 656 children who had two or more years of experience in the experimental program. The control group was made up of the 602 children who had one year or less in the experimental program. Table 3 shows the mean reading readiness, IQ, and STEP Reading scores for the two groups.

TABLE 3

Mean Reading Readiness, IQ, and STEP Reading Score for the Experimental and Control Groups

	N	Reading Readiness	IQ	STEP Reading
Experimental	656	56.2	110.8	248.9
Control	602	54.4	108.9	245.6

The F-ratio resulting from the analysis of covariance controlling IQ was 9.0. When reading readiness was controlled the F-ratio was 8.1. Both are significant at the .01 level.

Summary

1. When reading readiness and/or IQ are controlled in the analysis of fourth grade reading achievement, children in the experimental program for two or more years score significantly higher than other children. Children who begin the program in the third grade do not measurably benefit from it.

2. When reading readiness is controlled and second grade achievement test scores are analyzed, children in the experimental program score significantly higher than children in the control group.

3. When second grade achievement is controlled and third grade scores are analyzed, children who began the program in the first grade again gain significantly more than other children.

This finding suggests that the influence of the program is cumulative, and adds statistical weight to the belief that the first grade is the critical year in reading instruction. If starting the program in the second grade was as efficacious as starting in the first grade, Groups I and II would have been statistically equal in this analysis and both significantly higher than the control group.

4. When third grade achievement is controlled and fourth grade scores are analyzed, no significant differences in growth are found, but children in the second year of the program have the highest adjusted achievement.

This finding suggests that by the middle of the third grade achievement patterns are pretty well stabilized and smaller class size, by itself, does not have sufficient impact to change these patterns. Children in the experimental program are still growing at a faster rate in reading but the rate has slowed from the previous year.

5. When second grade scores are analyzed, the greater growth of the experimental group seems to be largely the result of increased achievement by boys.

This is a significant finding which lends weight to a current argument in reading instruction that typical classroom organization militates against achievement by boys.

6. At three of the four levels specified by the readiness test, children in the experimental group achieve more than children in the control groups. This suggests that reduced class size is beneficial to the child who learns with little difficulty as well as the child who finds reading a difficult task.

This, too, is an important finding for it is easier to justify a program which is beneficial at all levels of aptitude.